What is claimed is:

1. An electrochemical cell, which comprises:
   a) an anode of an alkali metal;
   b) a cathode of a composite cathode active material comprising a core of a first cathode active material provided with a coating of a second cathode active material, wherein the first cathode active material is not the second cathode active material; and
   c) an electrolyte activating the anode and the cathode.

2. The electrochemical cell of claim 1 wherein the first cathode active material is selected from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

3. The electrochemical cell of claim 1 wherein the coating is selected from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

4. The electrochemical cell of claim 1 wherein the anode is lithium and the composite cathode active material is of ε-phase SVO having its individual particles provided with a coating of γ-phase SVO.

5. The electrochemical cell of claim 1 wherein the composite cathode active material is contacted to a cathode current collector selected from the group consisting of stainless steel, titanium, tantalum, platinum, aluminum, gold, nickel, and alloys thereof.

6. The electrochemical cell of claim 1 wherein the core of the first cathode active material is of particles having a size of from about 30 μm to about 300 μm.

7. The electrochemical cell of claim 1 wherein the coating of the second cathode active material is of a thickness of about 1 μm to about 10 μm.

8. The electrochemical cell of claim 1 built in one of a case-negative design, a case-positive design and a case-neutral design.

9. The electrochemical cell of claim 1 wherein the electrolyte has a first solvent selected from the group consisting of tetrahydrofuran, methyl acetate, diglyme, trigylme, tetragylme, dimethyl carbonate, 1,2-dimethoxyethane, 1,2-diethoxyethane, 1-ethoxy,2-methoxyethane, ethyl methyl carbonate, methyl propyl carbonate, ethyl propyl carbonate, diethyl carbonate, dipropyl carbonate, and mixtures thereof, and a second solvent selected from the group consisting of propylene carbonate, ethylene carbonate, butylene carbonate, acetonitrile, dimethyl sulfoxide, dimethyl, formamide, dimethyl acetamide, γ-valerolactone, γ-butyrolactone, N-methyl-2-

pyrrolidone, and mixtures thereof.

10. The electrochemical cell of claim 1 wherein the electrolyte includes a lithium salt selected from the group consisting of $LiPF_6$, $LiBF_4$, $LiAsF_6$, $LiSbF_6$, $LiClO_4$, LiO_2, $LiAlCl_4$, $LiGaCl_4$, $LiC(SO_2CF_3)_3$, $LiN(SO_2CF_3)_2$, LiSCN, LiO_3SCF_3, $LiC_6F_5SO_3$, LiO_2CCF_3, $LiSO_6F$, $LiB(C_6H_5)_4$, $LiCF_3SO_3$, and mixtures thereof.

11. An implantable medical device, which comprises:

a) a device housing;

b) control circuitry contained inside the device housing;

c) an electrochemical cell housed inside the device housing for powering the control circuitry, the cell comprising:

i) an anode comprising lithium;

ii) a cathode of a composite cathode active material comprising a core of a first cathode active material provided with a coating of a second cathode active material, wherein the first cathode active material is not the second cathode active material; and

d) a nonaqueous electrolyte activating the anode and the cathode; and

e) a lead connecting the device housing to a body part intended to be assisted by the medical device, wherein the electrochemical cell powers the control circuitry both during a device monitoring mode to monitor the physiology of the body part and a device

activation mode to provide the therapy to the body part.

12. The implantable medical device of claim 11 wherein the first cathode active material is selected from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

13. The implantable medical device of claim 11 wherein the coating is selected from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

14. The implantable medical device of claim 11 wherein the anode is lithium and the composite cathode active material is of ε-phase SVO having its individual particles provided with a coating of γ-phase SVO.

15. The implantable medical device of claim 11 wherein the cathode active material is contacted to a cathode current collector selected from the group consisting of stainless steel, titanium, tantalum, platinum, aluminum, gold, nickel, and alloys thereof.

16. The implantable medical device of claim 11 wherein the core of the first cathode active material is of particles having a size of from about 30 μm to about 300 μm and the coating of the second cathode active material is of a thickness of about 1 μm to about 10 μm.

17. A method for providing a composite cathode active material, comprising the steps of:

a) providing a core cathode active material selected from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof is granular form;

b) providing a solution of an organic solvent having a coating metal selected from ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof provided therein, wherein the core cathode active material is not the coating cathode active material;

c) mixing the first core cathode active material into the sol-gel solution containing the second coating cathode active material to thereby form a gel of the second cathode active material coating the core cathode active material;

d) drying the resulting coated cathode active material to substantially remove the solvent material; and

e) heating the dried coated core cathode active material

to provide the composite cathode active material.

18. The method of claim 17 including selecting the first cathode active material from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

19. The method of claim 17 including selecting the coating from the group consisting of ε-phase SVO, β-phase SVO, γ-phase SVO, CSVO, V_2O_5, MnO_2, $LiCoO_2$, $LiNiO_2$, $LiMnO_2$, $LiMn_2O_4$, CuO_2, TiS_2, Cu_2S, FeS, FeS_2, Ag_2O, Ag_2O_2, CuF, Ag_2CrO_4, copper vanadium oxide, and mixtures thereof.

20. The method of claim 17 including providing the anode of lithium and the composite cathode active material of ε-phase SVO having its individual particles provided with a coating of γ-phase SVO

21. The method of claim 17 including providing the sol-gel solution as either an aqueous or a nonaqueous solution.

22. The method of claim 17 including mixing the coating metal with the active material in a range, by weight, of about 1:3 to about 1:20.

23. The method of claim 17 including drying the coated cathode active material at a reduced pressure in a range of about 20 inches of Hg. to about 50 inches of Hg.

24. The method of claim 17 including drying the coated cathode active material at a temperature in a range of about 200°C to about 500°C.

25. The method of claim 17 including drying the coated cathode active material for a time of about 10 minutes to about 6 hours.